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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,881	09/23/2003	Robin E. Gorrell	58053US005	3599
32692	7590	06/27/2005	EXAMINER	
3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			CHU, CHRIS C	
			ART UNIT	PAPER NUMBER
			2815	
DATE MAILED: 06/27/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

<b>Office Action Summary</b>	<b>Application No.</b> 10/668,881	<b>Applicant(s)</b> GORRELL ET AL.	
	<b>Examiner</b> Chris C. Chu	<b>Art Unit</b> 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2005.  
 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1 - 8 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1 - 8 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☒ The drawing(s) filed on 18 April 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
     \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's amendment filed on April 18, 2005 has been received and entered in the case.

### ***Drawings***

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because:
  - a) the specification does not include the following reference sign mentioned in the drawings:
    - i) In Fig. 11c, reference numeral "1200c" are not disclosed in the specification.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Since applicant has not responded or amended to the objection in the above paragraph, the objection is maintained.

*Specification*

3. The disclosure is objected to because of the following informalities:

(a) On page 6, line 8 of Applicant's amendment, "region 1210a, 1210b, 1210c exists near the die corner 1200a, 1200b" should be -- regions 1210a, 1210b, 1210c exist near the die corners 1200a, 1200b, and 1200c--.

Appropriate correction is required.

*Claim Objections*

4. Claim 8 is objected to because of the following informalities:

(A) In claim 8, line 2, "said solder mask" should be --a solder mask--.

Appropriate correction is required.

*Claim Rejections - 35 USC § 102*

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 4 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Wensel et al. (U. S. Pat. No. 6,291,899).

Regarding claim 1, Wensel et al. discloses in e.g., Fig. 4A a laminated flip-chip interconnect package (a package 36 in Fig. 4A and column 4, line 46) comprising

Art Unit: 2815

- a substrate (24; column 3, lines 38 – 39) having a chip attach surface (the top surface of the substrate 24 where the chip 26 is attached) and an opposing board attach surface (the bottom surface of the substrate 24; column 4, lines 64 – 65) that define contact pads (the pads between the solder ball 38 and the substrate 24, and pads on the top surface of the substrate 24 that are connected to the wire 30) for attachment to corresponding pads on the chip (26; column 3, line 40) and board (board; column 4, lines 64 – 65),
- wherein the board attach surface (at the bottom surface of the substrate 24) comprises
  - o contact pads (the pads between the solder ball 38 and the substrate 24, and pads on the top surface of the substrate 24 that are connected to the wire 30) opposite a chip attach location and regions “adjacent” the chip attach location on the chip attach surface except at least one solid plane area (at the area of the element 44; column 4, line 46) of the board attach surface,
  - o said area (at the area of the element 44) being opposite a chip attach surface region adjacent a corner of chip (see Fig. 4A), and
- said board attach surface comprising a dielectric material (44; column 5, lines 5 – 7).

Regarding claim 4, Wensel et al. discloses in e.g., Fig. 4A a laminated flip-chip interconnect package (a package 36 in Fig. 4A and column 4, line 46) comprising

- a substrate (24; column 3, lines 38 – 39) having a chip attach surface (the top surface of the substrate 24 where the chip 26 is attached) and an opposing board attach surface (the bottom surface of the substrate 24; column 4, lines 64 – 65) that define contact pads (the pads between the solder ball 38 and the substrate 24, and pads on

Art Unit: 2815

the top surface of the substrate 24 that are connected to the wire 30) for attachment to corresponding pads on the chip (26; column 3, line 40) and board (board; column 4, lines 64 – 65),

- wherein the board attach surface (at the bottom surface of the substrate 24) comprises
  - o at least one solid plane area (at the area of the element 44; column 4, line 46),
  - o said area (at the area of the element 44) being opposite a chip attach surface region adjacent at least one corner of a chip attach location (see Fig. 4A), and
- said board attach surface comprising a metal (44; column 5, lines 5 – 7).

Regarding claim 5, Wensel et al. discloses in e.g., Fig. 4A said metal being copper (copper 44; column 5, lines 5 – 7).

### *Claim Rejections - 35 USC § 103*

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2, 3 and 6 – 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wensel et al. in view of Jacobs (U. S. Pat. No. 6,294,407).

Regarding claims 2, 3, 6 and 7, while Wensel et al. discloses the use of the solid material (i.e., the dielectric or metal) on a solid plane area, Wensel et al. does not disclose a coverlay material. Jacobs teaches in e.g., Fig. 8 a solid material on a solid plane area (810; column 11, lines 28) being covered with a layer of a coverlay material (epoxy 130; column 7, lines 55 – 58).

Art Unit: 2815

It would have been obvious to one of ordinary skill in the art at the time when the invention was made to apply the coverlay material (e.g., epoxy) to cover the solid material (e.g., the dielectric or metal) on the solid plane area of Wensel et al. as taught by Jacobs to prevent short circuits between conductive bumps (column 8, lines 2 – 4).

Regarding claim 8, Wensel et al., as modified, discloses a solder mask (130 of Jacobs) having a plurality of openings (132 of Jacobs) defining ball grid array pads.

### *Response to Arguments*

9. Applicant's arguments with respect to claims 1 and 4 have been considered but are moot in view of the new ground(s) of rejection.

### *Conclusion*

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

Art Unit: 2815

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is 571-272-1724. The examiner can normally be reached on 11:30 - 8:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 571-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chris C. Chu  
Examiner  
Art Unit 2815

c.c.  
Tuesday, June 21, 2005

  
GEORGE ECKERT  
PRIMARY EXAMINER